

WHAT IS CLAIMED IS:

1. A data recording and reproduction apparatus for recording and reproducing an audio data stream as digital audio data, comprising:

a stream storage unit for storing the audio data stream;

a stream writing unit for writing the audio data stream into the stream storage unit; and

a stream reading unit for reading the audio data stream from the stream storage unit;

said stream writing unit including:

stream attribute decision means for deciding whether or not the audio data stream has been subjected to a data conversion process for digital audio data; and

stream writing means for attaching a conversion ID flag having a value according to the result of the decision to the audio data stream, and writing the flag-attached audio data stream into the stream storage unit; and

said stream reading unit including:

stream reading means for reading the audio data stream to which the conversion ID flag is attached, from the stream storage unit; and

watermarking means for inserting a watermark in the read audio data stream;

wherein the read audio data stream in which the watermark is to be inserted is subjected to an inverse conversion

process of the data conversion process, according to the value of the conversion ID flag attached to the audio data stream.

a 2. The data recording and reproduction apparatus of Claim 1 wherein said stream reading unit has DA conversion means for converting the audio data stream in which the watermark is inserted by the watermarking means, to analog audio data, and outputs the analog audio data.

3. The data recording and reproduction apparatus of Claim 1 wherein:

said data conversion process performed on the digital audio data is a compression process for compressing the digital audio data by coding;

said inverse conversion process is a decompression process for decompressing the compressed digital audio data by decoding; and

said stream writing means attaches a composition ID flag to the audio data stream as the conversion ID flag having a value according to the result of the decision, said composition ID flag indicating whether or not the audio data stream has been subjected to the digital audio data compression process.

4. The data recording and reproduction apparatus of Claim 3 wherein:

said stream reading unit further includes:

a stream flag decision means for deciding whether or not the audio data stream read from the stream storage unit has been subjected to the compression process, according to the compression ID flag of the read audio data stream; and

decoding means for decompressing, by decoding, the audio data stream which is decided as being subjected to the compression process by the stream flag decision means; and

the audio data stream which is decided as being not subjected to the compression process by the stream flag decision means, and the decompressed audio data stream output from the decoding means are supplied to the watermarking means.

5. The data recording and reproduction apparatus of Claim 3 wherein said stream reading unit has DA conversion means for converting the audio data stream in which the watermark is inserted by the watermarking means, to analog audio data, and outputs the analog audio data.

6. The data recording and reproduction apparatus of Claim 1 wherein:

said data conversion process performed on the digital audio data includes at least one of a compression process for compressing digital audio data by coding and a scramble process for scrambling digital audio data or compressed digital audio

data;

a said inverse conversion process includes at least one of a decompression process for decompressing compressed digital audio data by decoding and a descramble process for descrambling scrambled digital audio data or scrambled compressed digital audio data; and

said stream writing means attaches a compression ID flag and a scramble ID flag to the audio data stream as the conversion ID flag having a value corresponding to the result of the decision, said compression ID flag indicating whether or not the audio data stream has been subjected to the digital audio data compression process, and said scramble ID flag indicating whether or not the audio data stream or the compressed audio data stream has been subjected to the digital audio data scramble process.

7. The data recording and reproduction apparatus of Claim 6 wherein:

said stream writing unit further includes:

scramble key writing means for writing a scramble key adapted to the audio data stream which has been subjected to the scramble process, into the stream storage unit; and

said stream reading unit further includes:

scramble key reading means for reading the scramble key adapted to the audio data stream which has been subjected to the scramble process, from the stream storage unit;

first stream flag decision means for deciding whether or not the audio data stream read from the stream storage unit has been subjected to the scramble process, according to the scramble ID flag of the read audio data stream;

a) descrambling means for descrambling the audio data stream which is decided as being scrambled by the first stream flag decision means, by using the scramble key;

second stream flag decision means for deciding whether or not the audio data stream which is decided as being not scrambled by the first stream flag decision means, and the descrambled audio data stream output from the descrambling means have been subjected to the compression process, according to the compression ID flags of these audio data streams; and

decoding means for decompressing, by decoding, the audio data stream which is decided as being compressed by the second stream flag decision means; and

the audio data stream which is decided as being not scrambled by the first stream flag decision means and the descrambled audio data stream output from the descrambling means are supplied to the second stream flag decision means, while the audio data stream which is decided as being not compressed by the second stream flag decision means and the decompressed audio data stream output from the decoding means are supplied to the watermarking means.

8. The data recording and reproduction apparatus of Claim 5 wherein said stream reading unit has DA conversion means for converting the audio data stream in which the watermark is inserted by the watermarking means, to analog audio data, and outputs the analog audio data.

9. The data recording and reproduction apparatus of Claim 1 wherein:

said stream reading unit is constituted by a single apparatus for reproducing a data stream, and this stream reproduction apparatus includes means for holding apparatus type information which indicates the type of this apparatus; and

said stream storage unit includes:

stream storage means for storing the audio data stream output from the stream writing unit;

authorized apparatus type information storage means for storing authorized apparatus type information indicating stream reproduction apparatuses which are permitted to read the audio data stream from the stream storage means;

apparatus type information obtaining means for obtaining the apparatus type information held by the apparatus type information holding means; and

stream read permission decision means for searching the authorized apparatus type information storage means for the apparatus type information obtained by the apparatus type

information obtaining means, and permitting the stream reading unit to read the audio data stream from the stream storage unit only when an authorized apparatus type information corresponding to the obtained apparatus type information is present.

a 10. The data recording and reproduction apparatus of Claim 4 wherein:

said stream reading unit is constituted by a single apparatus for reproducing a data stream, and this stream reproduction apparatus has means for holding apparatus type information indicating the type of this apparatus; and

said stream storage unit includes:

stream storage means for storing the audio data stream output from the stream writing means;

authorized apparatus type information storage means for storing authorized apparatus type information indicating stream reproduction apparatuses which are permitted to read the audio data stream from the stream storage means;

apparatus type information obtaining means for obtaining the apparatus type information held by the apparatus type information holding means; and

stream read permission decision means for searching the authorized apparatus type information storage means for the apparatus type information obtained by the apparatus type information obtaining means, and permitting the stream reading

unit to read the audio data stream from the stream storage unit only when an authorized apparatus type information corresponding to the obtained apparatus type information is present.

11. The data recording and reproduction apparatus of Claim 7 wherein:

said stream reading unit is constituted by a single apparatus for reproducing a data stream, and this stream reproduction apparatus has means for holding apparatus type information indicating the type of this apparatus; and

said stream storage unit includes:

stream storage means for storing the audio data stream output from the stream writing unit;

scramble key storage means for storing the scramble key output from the stream writing means;

authorized apparatus type information storage means for storing authorized apparatus type information indicating stream reproduction apparatuses which are permitted to read the audio data stream from the stream storage means;

apparatus type information obtaining means for obtaining the apparatus type information held by the apparatus type information holding means; and

stream read permission decision means for searching the authorized apparatus type information storage means for the apparatus type information obtained by the apparatus type



information obtaining means, and permitting the stream reading unit to read the audio data stream from the stream storage means only when an authorized apparatus type information corresponding to the obtained apparatus type information is present.

12. The data recording and reproduction apparatus of Claim 7 wherein:

said stream reading unit is constituted by a single apparatus for reproducing a data stream, and this stream reproduction apparatus has means for holding apparatus type information indicating the type of this apparatus; and

said stream storage unit includes:

stream storage means for storing the audio data stream output from the stream writing unit;

scramble key storage means for storing the scramble key output from the stream writing unit;

authorized apparatus type information storage means for holding authorized apparatus type information indicating stream reproduction apparatuses which are authorized to read the audio data stream from the stream storage means;

apparatus type information obtaining means for obtaining the apparatus type information held by the apparatus type information holding means; and

scramble key read permission decision means for searching the authorized apparatus type information storage means for the

a! apparatus type information obtained by the apparatus type information obtaining means, and permitting the scramble key reading means to read the scramble key from the scramble key storage means only when an authorized apparatus type information corresponding to the obtained apparatus type information is present.

13. The data recording and reproduction apparatus of Claim 1 wherein the stream storage unit is implemented by an IC card on which a RAM for storing audio data stream and a CPU for controlling access to the audio data stream stored in the RAM are mounted.

14. The data recording and reproduction apparatus of Claim 9 wherein:

the stream storage unit is implemented by an IC card on which a RAM for storing an audio data stream and a CPU for controlling access to the audio data stream stored in the RAM are mounted;

the stream storage means and the authorized apparatus type information storage means are implemented by the RAM; and

the apparatus type information obtaining means and the stream read permission decision means are implemented by the CPU.

15. The data recording and reproduction apparatus of Claim 11 wherein:

the stream storage unit is implemented by an IC card on which a RAM for storing an audio data stream and a CPU for controlling access to the audio data stream stored in the RAM are mounted;

the stream storage means, the scramble key storage means, and the authorized apparatus type information storage means are implemented by the RAM; and

the apparatus type information obtaining means and the stream read permission decision means are implemented by the CPU.

16. The data recording and reproduction apparatus of Claim 12 wherein:

the stream storage unit is implemented by an IC card on which a RAM for storing an audio data stream and a CPU for controlling access to the audio data stream stored in the RAM are mounted;

the stream storage means, the scramble key storage means, and the authorized apparatus type information storage means are implemented by the RAM; and

the apparatus type information obtaining means and the scramble key read permission decision means are implemented by the CPU.